

Appendix 2 to Item C2

Request for approval of details pursuant to conditions 4, 7, 8, 12, 17 and 27 of planning permission TM/88/1002 at Blaise Farm Quarry, Blaise Quarry Road, Kings Hill, West Malling, Kent ME19 4PN – TM/88/1002/RVARA (KCC/TM/0121/2020)

Appendix 2:

- **Appendix 2:** Report to the KCC's Regulation Committee on 25 May 2004 (with revised recommendation and draft documents titled "Guidance on Blasting at Ragstone Quarries in Kent" and "Procedure for dealing with complaints relating to blasting at Quarries in Kent").

REGULATION COMMITTEE, 25 MAY 2004, ITEM 3

Revised Recommendation:

20. That Members note the content of this report and agree that the Head of Planning Applications:-
- (1) make the documents titled "Guidance on Blasting at Ragstone Quarries in Kent" and "Procedure for dealing with complaints relating to blasting at Quarries in Kent", attached respectively at Appendices 2 and 3, publicly available in an appropriate format; and
 - (2) keep all the blasting related issues under review (including air overpressure) and update or supplement the documents as necessary.
 - (3) undertake independent blast monitoring for Hermitage Quarry without the requirement for the 5mms^{-1} trigger to be reached on up to 4 occasions each year until such a time as provision is made for independent blast monitoring as part of any Blast Monitoring Scheme for Hermitage Quarry (Gallaghers), and add a footnote to paragraph 14 of the "Procedure for dealing with complaints relating to blasting at Quarries in Kent" to this effect.

Item 3

Procedure for dealing with complaints relating to blasting and guidance on blasting at ragstone quarries in Kent

A report by Head of Planning Applications to the Regulation Committee on 25 May 2004.

Summary: Update for Members on progress with addressing the Regulation Committee Member Panel resolution dated 7 January 2004 including proposed procedure for dealing with complaints relating to blasting and guidance on blasting at ragstone quarries in Kent.

Recommendation: That Members note the report and agree that Head of Planning Applications make the Procedure and Guidance publicly available, keep all the blasting related issues under review (including air overpressure) and update or supplement the Procedure and Guidance as necessary.

Local Members: Various

Unrestricted

Background:

1. Members will recall that a report on the consideration of complaints relating to blasting at Blaise Farm Quarry, Offham (Hanson Aggregates) was presented to a Regulation Committee Member Panel on 7 January 2004. The Panel resolved that the contents of the report be noted and the following be agreed, and that:
 - (a) the Head of Planning Applications Unit inform Offham Parish Council that:
 - (i) KCC is unable to give it the assurances or guarantees that it is seeking about potential damage to properties;
 - (ii) given that the terms of planning permission TM/88/1002 are being complied with and that there does not appear to be any published information to support the view that structural damage may be caused, KCC cannot require Hanson to cease blasting;
 - (iii) it is for Hanson to decide whether it is prepared to continue blasting and face potential legal claims from residents or others if it is subsequently established that blasting has caused any damage;
 - (iv) following a recommendation from the Environment Agency that the issue of potential effects of vibration on the integrity of the landfill liner at Offham Landfill Site be investigated, KCC has written to both Hanson and Waste Recycling Group (WRG) to ask that they investigate the matter;
 - (v) issues relating to (iv) above, are for WRG to address as part of its ongoing responsibilities under its waste management licence. The waste management licence requires ongoing monitoring of landfill gas which would identify any changes to the current situation. The waste management licence also requires adequate controls to be maintained at the site in order to prevent gas migration, and that these could be altered if necessary; and
 - (vi) issues relating to blasting at Blaise Farm Quarry should be addressed through the Blaise Farm Quarry Liaison Committee;

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- (b) the Head of Planning Applications Unit inform West Malling Parish Council, Kings Hill Parish Council and Mereworth Parish Council of his response to Offham Parish Council;
- (c) the Head of Planning Applications take a report to the Regulation Committee setting out:-
 - (i) a formal procedure for dealing with complaints relating to blasting (to include those circumstances in which KCC may arrange independent monitoring and the extent of such monitoring); and
 - (ii) appropriate information on blasting-related issues that can be provided to the local community (possibly a leaflet explaining the issues);
- (d) the Head of Planning Applications:
 - (i) encourage Hanson to fully investigate the ongoing complaint relating to the office building at Comp Lane, Offham;
 - (ii) encourage Hanson to investigate further complaints of alleged damage to property where these could reasonably be related to blasting;
 - (iii) encourage Hanson to be more proactive in communicating with the local community on blasting and related issues; and
 - (iv) require Hanson to review the current Blast Monitoring Scheme in consultation with KCC and submit a revised scheme for approval; and
- (e) the Head of Planning Applications investigate the use of specific limits on air overpressure (e.g. an appropriate dB limit at specified locations) for possible inclusion as part of any future permissions or approvals for blasting.

The Purpose of this Report:

2. This report updates the Regulation Committee on progress with the above issues generally and specifically sets out a proposed Procedure for dealing with complaints and Guidance that could be used to inform the local community.

Resolution Items (a), (b), (d) and (e):

3. The Head of Planning Applications wrote to all four relevant Parish Councils informing them of the outcome of the Regulation Committee Member Panel in accordance with resolution items (a) and (b) and to Hanson in respect of resolution item (d) on 7 January 2004.
4. The main reason for reporting to the Regulation Committee Member Panel on 7 January 2004, rather than awaiting the Regulation Committee meeting on 27 January 2004, was to establish KCC's formal position on the various blasting related issues prior to the next Blaise Farm Quarry Liaison Meeting. The Liaison Meeting was held on 22 January 2004. Members may also be aware that the blasting issue has been reported in the media (including on BBC television). The fact that KCC had a formal position on the various matters proved helpful.
5. Since being informed of the outcome of the Regulation Committee Member Panel, Hanson have continued to investigate the ongoing complaint relating to the office building at Comp Lane, Offham. However, the matter has not yet been resolved to the

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satisfaction of the property owner as the investigations have proved inconclusive as to the precise cause of the damage. Hanson have also indicated a willingness to investigate further complaints as and when these may arise and are currently in the process of discussing related issues with a number of people living very near to the quarry. Hanson have also proved more willing to communicate with the local community by agreeing to increase the frequency of the Blaise Farm Quarry Liaison Meetings, by circulating a note on the environmental effects of blasting to its attendees and by inviting the local community to a presentation on blasting at Offham Village Hall and a blast at the quarry.

6. Together with KCC officers, Hanson have reviewed the Blast Monitoring Scheme. This was circulated to Tonbridge and Malling Borough Council, all 4 local Parish Councils and the 3 KCC local members in draft for comment. The revised scheme now includes for additional monitoring to be undertaken by Hanson for each blast (4 locations as opposed to 1), better notification to the local community on the timing of future blasts, the provision of blast monitoring results to all members of the Blaise Farm Quarry Liaison Group (in tabular form) and measures to facilitate independent monitoring by KCC (see paragraph 9 below). Hanson have also agreed to reimburse KCC for independent blast monitoring on up to 4 occasions each year. These measures accord with the aims of resolution items (d)(i)-(iv). A copy of the revised Blast Monitoring Scheme dated April 2004 is attached at Appendix 1 for information.
7. The most recent Blaise Farm Quarry Liaison Meeting was held on 22 April 2004. Hanson circulated schedules of blast monitoring results and complaints. The discussion was better informed and less confrontational than previously and the entire range of quarry related issues was discussed. It was agreed that the next liaison meeting would take place on 16 September 2004.
8. Consideration of the air overpressure levels obtained with the vibration monitoring results undertaken so far at the site, indicates that these have been consistently lower than the 120dB imposed by some other Mineral Planning Authorities (as referred to in paragraph 24 of the 7 January 2004 Regulation Committee Member Panel Report). On this basis, and since Government Guidance indicates that air overpressure should be controlled via blast schemes and blast design rather than by imposing specific limits, it is considered that no further action should be taken in respect of resolution item (e). However, if future blast monitoring results for either Blaise Farm Quarry or Hermitage Quarry suggest that air overpressure levels experienced are unacceptable or should be specifically controlled for some reason, further consideration should be given to this issue.

Resolution Item (c):

9. Notwithstanding the fact that Hanson have circulated a note on the environmental effects of blasting to attendees of the Blaise Farm Quarry Liaison Meeting, a draft Procedure for dealing with complaints relating to blasting and Guidance on blasting related issues were prepared and circulated to those District and Parish Councils and KCC local members affected by blasting at Blaise Farm Quarry and Hermitage Quarry.¹ These were also sent to Hanson, Gallaghers and Babbie for comment.

¹ Tonbridge & Malling BC; Maidstone BC; Offham PC; West Malling PC; Kings Hill PC; Mereworth PC; Ditton PC; Aylesford PC; Barming PC; East Malling & Larkfield PC; & KCC Cllrs Mrs S Hohler; Mrs V Dagger; Mrs T Dean; Mr D Daley; Mr G Rowe; Mrs P Stockell.

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10. Written responses have been received from Tonbridge & Malling Borough Council, Maidstone Borough Council, Offham Parish Council, Hanson, Gallaghers, Babbie and Councillor Hohler. A verbal response was received from Councillor Rowe.
11. Rather than present different versions of the same draft documents, this report sets out the proposed revised documents that have been informed by the consultee responses. Documents titled "Guidance on Blasting at Ragstone Quarries in Kent" and "Procedure for dealing with complaints relating to blasting at Quarries in Kent" are attached respectively at Appendices 2 and 3.

Guidance on Blasting at Ragstone Quarries in Kent

12. "Guidance on Blasting at Ragstone Quarries in Kent" (Appendix 2) explains the main issues relating to blasting in Kent, why blasting is undertaken and the main steps taken to control unacceptable side-effects. It is aimed at members of the public and others who may be interested and is not intended to be a technical paper.

Procedure for dealing with complaints relating to blasting at Quarries in Kent

13. "Procedure for dealing with complaints relating to blasting at Quarries in Kent" (Appendix 3) sets out how the County Council will respond to complaints relating to blasting at quarries in Kent, the process for investigating and recording these complaints and the timescales involved. It also provides appropriate contacts for making complaints or seeking further information about blasting. The Procedure needs to be read alongside the Planning Enforcement Protocol.
14. Whilst the majority of the changes suggested by consultees have been accommodated in the proposed Procedure, one particular issue has not. Both Maidstone and Tonbridge and Malling Borough Councils (Environmental Health) have expressed the opinion that the 'trigger' for initiating independent monitoring by KCC beyond that provided for under the terms of the relevant blast monitoring scheme should be lower than the 5mms^{-1} proposed in paragraphs 14 and 15 of the Procedure. They have expressed a preference for a 3mms^{-1} 'trigger', but indicated that they would accept 4mms^{-1} .
15. The reason put forward by the Borough Councils for a lower 'trigger' is that they consider that the 5mms^{-1} 'trigger' lacks stringency and would only lead to independent monitoring where compliance is in doubt rather than after the point where the objective is reassurance. Maidstone Borough Council has also stated that if vibration is reaching 5mms^{-1} there is a reasonable risk that 6mms^{-1} is being exceeded (more than 1:20).
16. Notwithstanding the two Borough Council views, KCC's blast consultant (Babbie) has advised that the 5mms^{-1} 'trigger' is entirely appropriate for KCC's purposes and provides a further factor of safety. This is on the basis that the 6mms^{-1} figure on the planning permission is for 95% of the time and that the permitted absolute maximum vibration is 12mms^{-1} . Effectively, the 95% figure allows for vibration to exceed 6mms^{-1} for 5% of the time (i.e. 1:20). Further, since the 6mms^{-1} figure provides a conservative assessment of the 95% confidence level (i.e. if the 6mms^{-1} limit is exceeded in less than 1:20 blasts) there is a minimal chance that the 12mms^{-1} limit would be breached.

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17. Whilst public perceptions and concerns are important issues which need to be taken seriously, KCC as Mineral Planning Authority has set certain limits on the relevant planning permissions at both Blaise Farm and Hermitage Quarries and is responsible for ensuring compliance with these. The existing blast monitoring arrangements for both Quarries already provide a significant amount of data which, together with the proposed arrangements, would provide satisfactory information on compliance. The results of blast monitoring is often shared with Parish Council representatives through the respective Quarry Liaison Groups to provide reassurance to the local communities. It should also be noted that paragraphs 14 and 15 of the Procedure would provide flexibility for further monitoring by KCC irrespective of whatever ground vibration levels are recorded.
18. Irrespective of whatever criteria is used by KCC for its own independent monitoring, it is still open to both Maidstone and Tonbridge and Malling Borough Councils to undertake whatever monitoring or other investigations they consider appropriate under separate (non-planning) legislation if they receive any complaints relating to blasting or if they simply wish to investigate the issue further.
19. I do not propose to alter the 'trigger' for initiating independent monitoring by KCC set out in paragraphs 14 and 15 of the Procedure.

Recommendation:

20. That Members note the content of this report and agree that the Head of Planning Applications:-
 - (1) make the documents titled "Guidance on Blasting at Ragstone Quarries in Kent" and "Procedure for dealing with complaints relating to blasting at Quarries in Kent", attached respectively at Appendices 2 and 3, publicly available in an appropriate format; and
 - (2) keep all the blasting related issues under review (including air overpressure) and update or supplement the documents as necessary.

Case Officer: Jim Wooldridge

Tel. no. 01622 221060

**BLAISE FARM QUARRY, OFFHAM
HANSON AGGREGATES
BLAST MONITORING SCHEME
APRIL 2004**

1.0 Methodology to be adopted

- 1.1 In order to demonstrate compliance with the blast vibration criteria monitoring shall be undertaken close to nearest adjacent sensitive locations which shall include:

Kentfield House
Ashtree Farm
The Crest
No. 25 Mosquito Close
Remains of the Chapel of St Blaise

- 1.2 Prior to each blast vibration levels will be predicted for all of the designated locations.
- 1.3 Subject to landowner / occupier permission, monitors will be located at the four monitoring locations with the highest predictions. If permission is not forthcoming for any location, the monitor shall be located at a suitable location as near to the sensitive location as possible.
- 1.4 The monitoring will be undertaken in accordance with the principles of British Standard 7385: Part 1, 1990.
- 1.5 The prevailing weather conditions shall be noted at the time of the blast.
- 1.6 The results to be submitted to the Mineral Planning Authority will comprise a copy of the printout from the monitoring instrumentation which should include at least peak particle velocities in three mutually perpendicular planes together with the date and time. The records should also indicate the monitoring location, weather conditions and blast design details including an accurate plan showing the position of the blast in relation to the monitoring location, total explosive charge weight and maximum instantaneous explosive charge weight.
- 1.7 The results to be retained on site by Hanson Aggregates will be tabulated together with date, time, monitoring location and blast design details including an accurate plan showing the position of the blast in relation to the monitoring location, total explosive charge weight and maximum instantaneous explosive charge weight.
- 1.8 The results will be submitted to the Mineral Planning Authority within 24 hours of each blast. Hanson Aggregates will also provide the results of blast monitoring in tabular form with the Agenda for each Blaise Farm Quarry Liaison Meeting to all invitees.

- 1.9 Hanson Aggregates will notify the Mineral Planning Authority of its intention to blast at least 72 hours before the anticipated time of the blast and confirm the expected time of the blast no less than 4 hours in advance. This information will be sent by E-mail and telephone to the Mineral Planning Authority and will be copied by Hanson Aggregates (E-mail only) to the Mineral Planning Authority's vibration consultant, Tonbridge and Malling Environmental Health and Housing Service and one representative of each relevant Parish Council¹ provided an appropriate E-mail address is provided.

2.0 Instrumentation

- 2.1 Seismographic instrumentation recording ground vibration in terms of peak particle velocity in three mutually perpendicular planes of measurement and air overpressure in dB (linear) shall be used.
- 2.2 All instrumentation will have valid certificates of calibration.

3.0 Locations and Frequency of Monitoring

- 3.1 The monitoring location shall be determined as described in 1.2 and 1.3 above.
- 3.2 At twelve monthly periods at either the request of the Mineral Planning Authority or Hanson Aggregates the monitoring procedures will be reviewed.

4.0 Complaints Procedure

- 4.1 Should complaints be made to the quarry management relating to blast vibration, then these shall be immediately investigated and, where necessary, measures to control the effects shall be implemented. The results of the investigations shall be submitted to the Mineral Planning Authority within 72 hours of their completion.
- 4.2 All such complaints, and any action undertaken as a result of the investigation, shall be recorded in a log held at the quarry office which will be available for inspection by the Mineral Planning Authority. Hanson Aggregates will provide a list of complaints in tabular form with the Agenda for each Blaise Farm Quarry Liaison Meeting to all invitees.

5.0 Independent Monitoring

- 5.1 Hanson Aggregates shall, on request, pay the reasonable expenses incurred by the Mineral Planning Authority in undertaking independent monitoring at no more than one location on up to 4 occasions each year. The precise location(s) will be determined by the Mineral Planning Authority in consultation with Tonbridge and Malling Borough Council Environmental Health Unit and the relevant Parish Councils. The Mineral Planning Authority will not inform

¹ Offham Parish Council, West Malling Parish Council, Kings Hill Parish Council and Mereworth Parish Council.

Hanson Aggregates in advance of this monitoring, but will provide the results to Hanson Aggregates, Tonbridge and Malling Borough Council Environmental Health Unit and the relevant Parish Council(s). The independent monitoring will include measurements for ground vibration and air overpressure as detailed in paragraph 2.1 above and all equipment used will conform with paragraph 2.2.

GUIDANCE ON BLASTING AT RAGSTONE QUARRIES IN KENT

The Purpose of this Guidance Note

1. This Guidance Note has been prepared to explain the main issues relating to ragstone blasting in Kent to members of the public and others who may be interested.

Background

2. Kent County Council, as the Minerals Planning Authority (MPA), has responsibility for preparing a Minerals Development Framework and dealing with planning applications for mineral development. In some circumstances, mineral working may necessitate blasting. When dealing with applications for mineral working involving blasting the County Council will normally impose conditions that require blasting to be undertaken in a particular way and within specified limits. The County Council is then responsible for ensuring that any planning conditions are adhered to and for taking action to secure compliance should this be necessary and expedient. Where breaches of planning control are identified, the County Council has discretionary power to take enforcement action where this is in the public interest.
3. District / Borough Councils also have a role in the regulation of blasting at quarries. The relevant Environmental Health Department is responsible for ensuring that blasting operations give rise to no statutory nuisance. Although there is no legal definition of a statutory nuisance it is often taken to be something that would be prejudicial to people's health or unreasonably interfere with a person's legitimate use and enjoyment of land. In respect of blasting, it is unlikely that a claim of statutory nuisance could be substantiated where the terms of the relevant planning permission are being met. Kent County Council and the relevant District / Borough Councils work together to minimise any adverse effects of blasting.
4. In the past, blasting has been used at several ragstone quarries in Kent, but is currently only undertaken at Blaise Farm Quarry, Offham (Hanson Aggregates Ltd) and at Hermitage Quarry, Barming (Gallagher Aggregates Ltd). These are the only operational ragstone quarries in Kent. Blasting was previously used at the former ragstone quarries at Offham and Allington. It was also used to break up an ironstone layer in the sand quarry at Aylesford. Blaise Farm Quarry and Hermitage Quarry are both within Tonbridge and Malling, but the latter is close to Maidstone.

Why Blast?

5. Blasting is required to loosen the in-situ rock to facilitate its removal by mechanical excavators and dump trucks before it is crushed and processed prior to sale. Due to the costs involved in blasting, it is only undertaken where geological conditions make alternative extraction techniques either impossible or uneconomic, or where these alternatives would have worse environmental effects.

The Blasting Process

6. The use of explosives in quarries is controlled by The Quarries Regulations 1999. The blasting process requires a number of holes to be drilled behind the quarry face at a calculated distance and interval, as part of the blast design process, to release a particular amount of mineral. The holes are then charged with a predetermined

amount of explosive (charge weight) and a detonator and capped with inert material (stemmed). Each blast is carried out under strict guidelines.

Environmental Effects of Blasting

7. Blasting can have impacts which can be detected beyond the site boundary. These are Ground Vibration; Air Overpressure (i.e. airborne vibration); Noise; Dust and Flyrock. The main effects experienced in Kent are Ground Vibration and Air Overpressure. Due to the naturally fissured nature of ragstone and the smaller amounts of explosive used, the effects of blasting in Kent are generally less than those experienced elsewhere in the Country. All figures quoted in the following sections are sourced from Government Guidance and "The Environmental Effects of Production Blasting from Surface Mineral Workings" (DETR, 1998).

Ground Vibration

8. When blasting occurs, shock waves are generated causing very localised ground distortion and cracking immediately adjacent to the quarry face. Outside this immediate area, stress waves cause the ground to exhibit elastic properties whereby rock particles are returned to their original position as the stress waves pass. Ground vibration is always generated by blasting and will radiate away from the site, attenuating as distance increases. It is in the operator's interest to reduce both ground and airborne vibration from blasting to the minimum possible as this substantially increases the efficiency of the process.
9. Much investigation has been undertaken into the damage potential of blast induced ground vibration, resulting in an adopted method of monitoring. This allows for results to be obtained in terms of the peak particle velocity (ppv), which is measured in mms^{-1} (i.e. millimetres per second). Government Guidance, in the form of Mineral Planning Guidance Notes, recommend a ground vibration limit for hard rock blasting of between 6mms^{-1} and 12mms^{-1} at the nearest residential property as being acceptable.
10. Ground vibration can be affected by certain blast design parameters:-
- The maximum instantaneous charge (or MIC), which is the amount of explosives fired at the same moment in time.
 - The number of individual small explosions within the blast and the time gap between them (known as the delay, in milliseconds).
 - The overall dimensions of the blast, which comprises the distance between each hole (the spacing), the distance between the hole and the quarry face (the burden) and the depth of the hole.
 - The geology between the blast site and the vibration sensitive location. As this is outside the control of the operator a blast design must be used that takes account of any geological effects. This is achieved by the operator monitoring all blasts and modifying design appropriately.
11. Ground vibration at the nearest vibration sensitive properties associated with blasting at Blaise Farm Quarry and Hermitage Quarry are controlled by planning conditions. With the exception of specific additional restrictions relating to the remains of the Chapel of St. Blaise (for Blaise Farm Quarry) and Maidstone Hospital (for Hermitage Quarry), the permitted vibration limits at vibration sensitive properties are a peak particle velocity of 6mms^{-1} in 95% of all blasts when measured over any period of one month and a maximum peak particle velocity of 12mms^{-1} at any time.

Property Damage

12. Research work has been undertaken by various independent Authorities around the world into vibration levels that are likely to induce damage in properties, both cosmetic and structural. Cosmetic damage could include hairline cracks or the growth of existing cracks in plaster, drywall surfaces or mortar joints. Structural damage relates to actual damage to the structural elements of buildings. The United States Bureau of Mines has reviewed all relevant research and produced safe blasting vibration criteria for houses. These indicated that:-
- Values in excess of 50mms^{-1} are necessary to produce appreciable structural damage.
 - The onset of cosmetic damage can be associated with levels of around 25mms^{-1} .

Independent research in the UK has indicated similar values. The limits adopted in Kent for blasting operations have been set well below these figures to allow a considerable factor of safety.

13. Normal domestic activities also produce vibration within buildings. Table 1 illustrates the vibration associated with domestic activities. Heat, moisture, settlement, occupational loads, pre-stressing forces, material creep and chemical changes all cause movement in buildings. These result in stress concentrations in structural elements. For example, daily changes in temperature and humidity can create stresses equivalent to vibration between 30 and 70mms^{-1} . British Standard BS 7385 "Evaluation and Measurement for Vibration in Buildings. Part 1: Guide for Measurement of Vibrations and Evaluation of Their Effects on Buildings" (1990) and "Part 2: Guide to Damage Levels from Groundborne Vibration" (1993) provide guidance on the effects of vibration on buildings.

Table 1: Vibration levels generated by everyday activities

Activity	Vibration Level
Walking, measured on a wooden floor	$1.0 - 2.5 \text{ mms}^{-1}$
Door slam, measured on a wooden floor	$2.0 - 5.0 \text{ mms}^{-1}$
Door slam, measured over a doorway	$12 - 35 \text{ mms}^{-1}$
Footstamp, measured on wooden floor	$5 - 50 \text{ mms}^{-1}$

Human Perception

14. Human perception levels are difficult to define precisely as they vary from person to person. The human body is very sensitive to vibration which can result in concern being expressed about levels well below the threshold of damage. A person will generally become aware of blast induced vibration at levels of around 1.5mms^{-1} and under some circumstances this can be as low as 0.5mms^{-1} , even though such vibration is routinely generated within any property and is entirely safe.
15. British Standard BS 6472: 1992 "Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)" provides a guide to the evaluation of human exposure to vibration in buildings. It specifically mentions blasting vibration. It recommends a satisfactory magnitude of 8.5mms^{-1} at a 90% confidence level with an absolute limit of 12.7mms^{-1} for up to three occurrences per day at residential properties. For planning purposes the Government recommends limits lower than these.

Air Overpressure

16. Quarry blasts also generate a series of pressure waves in the air, known as air overpressure. This is similar to a series of gusts of wind condensed into a very short period of time. Air overpressure can make doors and windows rattle and give the impression that the whole house is shaking.
17. The effects of air overpressure are controlled through blast design and health and safety legislation. In accordance with Government Guidance, there are no specific limits imposed on air overpressure in Kent.
18. The maximum pressure in these airborne waves is known as the peak overpressure and is normally measured in decibels (dB). Air overpressure can be affected by meteorological conditions such as wind speed and direction, temperature, cloud cover and humidity. It can induce forces into buildings that can be compared to those generated by the wind. Table 2 compares the level of air overpressure with various strengths of wind.

Table 2: Comparison between wind speed and air overpressure equivalents

Wind Speed	Equivalent air overpressure
Constant wind of 5ms^{-1} , Beaufort Scale 3, Gentle breeze	120 dB
Constant wind of 8ms^{-1} , Beaufort Scale 4, Moderate breeze	130 dB
Constant wind of 20ms^{-1} , Beaufort Scale 8, Gale	140 dB

Note that the decibel scale is logarithmic and that an increase of 10dB sounds twice as loud and exerts approximately 4 times the pressure. 130db is therefore 4 times stronger than 120db and 150db is 17.5 times stronger than 125db. Wind speed is measured in metres per second (ms^{-1}).

Property Damage

19. Although it is possible that air overpressure could cause structural damage, those produced by routine blasting operations under normal atmospheric conditions are not likely to do so. Many air overpressure measurements undertaken over a wide range of conditions indicate that rarely do air overpressures exceed 125dB, and these levels are only recorded relatively close to the blast. Measurements for Blaise Farm Quarry and Hermitage Quarry are consistent with this.
20. The weakest parts of a structure that will be exposed to air overpressure are its windows; and so these are the most likely to suffer damage. Poorly mounted panes might be forced out of their frames while improperly mounted panes that are pre-stressed will be cracked and broken more easily. Air overpressure values of 150dB could be enough to crack badly mounted windows that are pre-stressed with most cracking at 170dB. Structural damage would not be expected at levels below 180dB.

Human Perception

21. Although structural damage is unlikely, air overpressure does play a most important role in the annoyance aspect of blasting. Relatively low levels can be sufficient to cause the rattling of loose ornaments or windows and hence give the impression of a significant ground vibration shaking the property.

22. Vibration levels as low as 0.5mms^{-1} can cause complaints when accompanied by such secondary noise effects. This is because the average person forms a judgement based largely on his or her perceptions, and is usually unaware of the important distinction between the characteristics of the motion alone and the sound effects that accompany it.

Noise, Dust and Flyrock

23. Environmental effects of noise associated with blasting may arise from the blast itself and from the secondary effects of air overpressure. The former would generally only be noticed infrequently and close to the quarry, whilst the latter could be experienced further away.
24. Environmental effects of dust and flyrock associated with blasting are not experienced outside the quarry. Due to the nature of blasting in Kent and the way the blasts are designed, these effects are generally limited to the area immediately surrounding the blast within the quarry.

Conclusion

25. This Guidance Note has shown why blasting is undertaken at ragstone quarries in Kent and the main steps taken to control unacceptable side-effects.

Complaints about Blasting in Kent

26. If you have any complaints about blasting in Kent please see "Procedure for dealing with complaints relating to blasting at Quarries in Kent" (KCC, 2004).

**Procedure for dealing with complaints relating to blasting at Quarries in Kent
Planning Applications Group, Kent County Council**

Purpose of the Procedure

1. The aim of this Procedure is to set out how the County Council will respond to complaints relating to blasting at quarries in Kent, the process for investigating and recording these complaints and the timescales involved. Although the procedure needs to be read alongside the Planning Enforcement Protocol, it is recognised that blasting gives rise to specific issues and concerns that may not be readily dealt with in that context.

The Role of the County Council in Minerals Planning and Blasting

2. As the Minerals Planning Authority (MPA), the County Council has responsibility for preparing a Minerals Development Framework (previously a Minerals Local Plan) and dealing with planning applications for mineral development (which may necessitate blasting). When dealing with applications for mineral working involving blasting the MPA will normally impose conditions that require blasting to be undertaken in a particular way and within specified limits. The MPA is then responsible for ensuring that any planning conditions are adhered to and for taking action to secure compliance should this be necessary and expedient. Where breaches of planning control are identified, the Authority has discretionary power to take enforcement action, where this is in the public interest.
3. District / Borough Council Environmental Health Units also have a role in seeking to ensure that blasting does not give rise to statutory nuisance. Although there is no legal definition of a statutory nuisance it is often taken to be something that would be prejudicial to people's health or unreasonably interfere with a person's legitimate use and enjoyment of land. In respect of blasting, it is unlikely that a claim of statutory nuisance could be substantiated where the terms of the relevant planning permission are being met.

Planning Controls over Blasting at Quarries in Kent

4. In the past, blasting has been used at several quarries in Kent, but is currently only undertaken at Blaise Farm Quarry, Offham (Hanson Aggregates Ltd) and at Hermitage Quarry, Barming (Gallagher Aggregates Ltd). These are the only operational ragstone quarries in Kent. Blasting was previously used at the former ragstone quarries at Offham and Allington and to break up an ironstone layer in the sand quarry at Aylesford.
5. The planning controls in place relating to blasting for Blaise Farm Quarry and Hermitage Quarry are slightly different. The consistent elements, which accord with Government Guidance in Minerals Planning Guidance: Environment Act 1995: Review of Mineral Planning Permissions (MPG14, September 1995), can be summarised as follows:-
 - Ground vibration as a result of blasting operations shall not exceed a peak particle velocity of 6mms^{-1} in 95% of all blasts when measured over any period of one month as measured at any vibration sensitive location;
 - Ground vibration as a result of blasting operations shall not exceed a (*maximum*) peak particle velocity of 12mms^{-1} as measured at any vibration sensitive location;
 - Effects such as air overpressure are minimised through appropriate schemes of blasting which have been approved by the MPA;

- The site operator is required to monitor the vibration associated with every blast and provide the results to the MPA on a regular basis;
 - The site operator is required to notify the MPA in advance of each blast.
6. Each site also has specific additional restrictions relating to specified vibration sensitive locations (e.g. Maidstone Hospital for Hermitage Quarry and the remains of the Chapel of St. Blaise for Blaise Farm Quarry). Blaise Farm Quarry is also restricted in terms of the maximum instantaneous charge (MIC) that can be used (i.e. the maximum amount of explosive detonated at any one precise time). The MIC limit is currently 10kg. There is no such restriction at Hermitage Quarry. It should be noted that a smaller MIC does not necessarily give rise to less vibration and visa versa.

Procedure for Investigating Blasting Complaints

7. This procedure will be used when dealing with complaints relating to blasting brought to the attention of the County Council.
8. Complaints relating to blasting will be logged onto the Group's complaints system by the individual taking the telephone call or accepting the letter or E-mail. The information should include:-
- the date and time that the complaint was received;
 - the nature of the complaint (including the date and time of the alleged incident);
 - the name, address and phone number of the complainant.
9. Details of the complaint will be passed to either the planning officer responsible for monitoring the site in question or to the Group's Minerals Technical Officer who is responsible for providing detailed advice on blasting and related issues (i.e. the "responsible officer"). The responsible officer will check that the complaints system has the above details and add:-
- subsequent follow up details.
10. The responsible officer will check whether the complaint relates to a date on which blasting actually took place at the relevant site.
11. If the times do not coincide, the complainant will be informed immediately of this fact. The responsible officer will discuss other possible causes for the complaint with the complainant where possible.
12. If the times coincide, the responsible officer will check the relevant site records (normally the relevant vibration monitoring information that is required to be submitted for every blast by the operator on a regular basis) to ensure compliance with the terms of the planning permission. The responsible officer will also discuss the complaint with the site operator to establish whether there may be any causes or unusual circumstances that may have contributed to the complaint.
13. If the monitoring results demonstrate compliance, the complainant will be informed accordingly. Alternatively, if the terms of the permission are not being met, the complainant will be informed of the action that the responsible officer intends to take. Initially, this will always involve discussions between the MPA and the relevant mineral operator designed to ensure future compliance. Ultimately, it could lead to formal action if this were deemed appropriate when considered against the KCC Planning Enforcement Protocol. The complainant will be advised of the outcome of the discussions with the site operator.

14. With the exception of any independent monitoring¹ agreed as part of the relevant Blast Monitoring Scheme for the site, the MPA will normally only consider undertaking independent monitoring when the vibration monitoring information provided by the operator indicates that the vibration levels are only just below those permitted (i.e. within 1mms^{-1} of the relevant permitted level) or if the MPA has specific reason to believe that the results may be inaccurate.
15. Thus, independent monitoring outside that provided for under the terms of any Blast Monitoring Scheme would normally only be undertaken to check results following a complaint when the minerals operator has recorded a peak particle velocity of greater than:-
 - 5mms^{-1} for any blast as measured at any vibration sensitive location.²
16. Independent monitoring may also be undertaken if the responsible officer has reasonable cause to believe that any other specific limits imposed at the site are being breached.
17. Where independent monitoring is to be initiated, the responsible officer will inform the complainant of this fact and the subsequent results of that monitoring accordingly.

Member Involvement

18. The relevant KCC Local Member(s) will be notified whenever independent monitoring is to be undertaken and will be appraised of the results of the monitoring. If the monitoring indicates that the permitted levels are being breached, the Local Member will be kept informed of any action.

Monitoring

19. Monitoring of vibration associated with blasting is undertaken by the site operator for every blast and the results submitted to the MPA on a regular basis. Independent monitoring may also be provided for under the terms of the Blast Monitoring Scheme.
20. Local Liaison Groups are in place for both Blaise Farm Quarry and Hermitage Quarry. Any unresolved complaints shall be raised at the relevant Liaison Group with the intention of swiftly resolving the issue to the satisfaction of the County Planning Authority.

Contacts

21. Complaints relating to blasting at mineral sites should in the first instance be made to the relevant mineral operator. Both mineral operators encourage this as it enables them to try to address concerns as soon as possible. Alternatively, complaints may be made to Kent County Council (as MPA) or the relevant District / Borough Council Environmental Health Unit (on the grounds of alleged statutory nuisance).

Complaints direct to the relevant mineral operator:

22. Blaise Farm Quarry (Hanson Aggregates Ltd): The Quarry Manager (01732) 529574
23. Hermitage Quarry (Gallagher Aggregates Ltd): The Quarry Manager (01622) 723911

¹ Independent monitoring is that monitoring which may be undertaken by or on behalf of the MPA.

² Although 6mms^{-1} is the vibration limit for 95% of blasts measured over any one month and 12mms^{-1} is the overall maximum limit for any blast, the frequency of blasting means that (in reality) 6mms^{-1} is the effective limit.

Complaints to KCC:

24. Complaints about both sites should either be made by telephone as soon as possible after the incident to one of the following numbers:-

Planning Applications Group Administration Team (01622) 221062;
Planning Applications Group Minerals Technical Officer (01622) 221064.

or, in writing addressed to: Bill Murphy (Head of Planning Applications), Strategic Planning, Kent County Council, Invicta House, County Hall, Maidstone, Kent ME14 1XX

Telephone: (01622) 221057; Fax: (01622) 221072

E-mail: planning.applications@kent.gov.uk

Complaints to the relevant Environmental Health Unit:

25. Blaise Farm Quarry: Tonbridge & Malling Borough Council Environmental Health and Housing Service (01732) 876184
26. Hermitage Quarry: Either Tonbridge & Malling Borough Council Environmental Health Unit (01732) 844522 or Maidstone Borough Council Environmental Health Unit (01622) 602000 (depending on which District you live in)